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Case report

Multiple variations of firearm injuries - A case report

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ABSTRACT

Variation from common findings in death due to firearm injury is not commonly encountered. When there is an atypical finding, the forensic pathologist may feel it difficult for differentiating firearm entry wound from firearm exit wound, tracing the wound track, estimating approximate range of firing and differentiating suicidal injury from homicidal injury. Failure to differentiate entry wound from exit wound can cause error in calculating number of projectiles entered into the body, lodged inside the body or exited through the body, besides posing problem in ascertaining direction of firing and direction of wound track etc. Failure to differentiate contact or close range firearm injury from distant range firearm injury can lead to wrong interpretation about the manner of death. The authors have reported a fatal case of rifled firearm injury showing multiple variations from common findings.

1. Introduction

Death due to firearm injuries commonly draw attention offorensic pathologist, for recovery of firearm projectiles from the dead body, differentiating firearm entry wound from firearm exit wound, tracing the wound track, estimating the approximate range of firing and differentiating suicidal injury from homicidal injury. Such case may need pre-autopsy X-Ray examination for easy location and recovery of firearm projectiles lodged inside the body, and thus avoids extensive dissection and disfigurement of the dead body. Failure to differentiate entry wound from exit wound can cause error in calculating number of projectiles entered into the body, lodged inside the body or exited through the body besides posing problem in ascertaining the direction of firing, and the direction of wound track. An atypical appearance of a gunshot wound can create surgical or medico-legal diagnostic problems.[1] Failure to differentiate contact or close range firearm injury from distant range firearm injury can mislead the police investigation and justice delivery system.In the present case report authors have presented a fatal case of rifle firearm injury with multiple variations.

2. Case report

A dead body of a male policeman, aged 25 years was referred to the Department of Forensic Medicine, Lady Hardinge Medical College, New Delhi for autopsy, with an alleged history of shooting himself using service rifle, while on duty. He was found unconscious in a pool of blood, with his back resting against the wall of the duty cabin. He was shifted to the hospital, where he was declared brought dead. Police suspected suicide, even though no suicidal note was recovered. Two cartridges were found missing from the magazine of the rifle.

3. External findings

No clothes were present on the body, except an under pant. Face was stained with blood Rigor mortis was present all over the body. Post-mortem lividity was marked on the back except over dependent parts. Signs of putrefaction had not developed.

4. External injuries

1. Firearm entry wound of 0.5 cm diameter, surrounded by the collar of abrasion, 0.1 cm width, was situated on the left anterior chest wall just above and medial to the left nipple. No muzzle impression, burning, singeing, smudging or tattooing was found around the wound (Fig. 1).
2. Firearm exit wound of size 1.2 cm × 0.8 cm with everted margins and extrusion of fat was present on the right side of upper back, 1.5 cm lateral to 7th cervical spine and 150 cm above the right heel (Fig. 2).
3. Firearm exit wound of size 0.6 cm × 0.6 cm was situated on the left side upper back, 1.5 cm lateral to midline and 123 cm above

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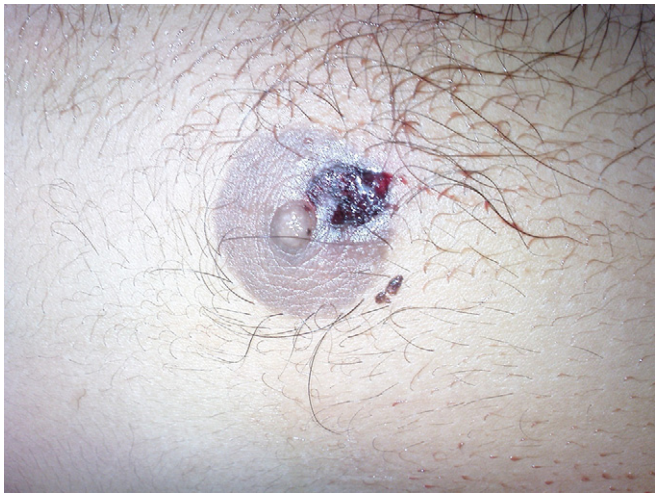

Fig. 1. Showing the firearm entry wound.

the left heel. The wound was surrounded with red colour eccentric abrasion of size 3.2 cm × 2.2 cm (Fig. 3).

4. Multiple abrasions red in colour, of sizes varying from 1 cm × 0.5 cm–2 cm × 1 cm were found on the both sides forehead, on the right cheek just above the malar prominence and on the front of left side knee.

5. Internal findings

Dissection of the wound track showed agap of 0.8 cm diameter traversing through the chest cavity, antero-posteriorly, in the 3rd inter costal space on the left side, 6.5 cm lateral to the midline, causing fracture of lower border of 3rd rib and bruising on the surrounding soft tissues. It was seen to pass through the upper lobe of the left lung. Comminuted fracture of the first, second and fifth vertebral bodies was present, along with laceration of underlying spinal cord. Fractured first -second thoracic vertebrae were communicating with the first exit wound. A small fragment of bullet was recovered near the right lateral aspect of fractured first thoracic vertebra. The fractured 5th thoracic vertebra was communicating with the second exit wound. Pleural cavities on both the sides contained fluid and clotted blood together about 1000 c.c. Rest of the internal examination was unremarkable.

Fig. 2. Showing the 1st firearm exit wound.

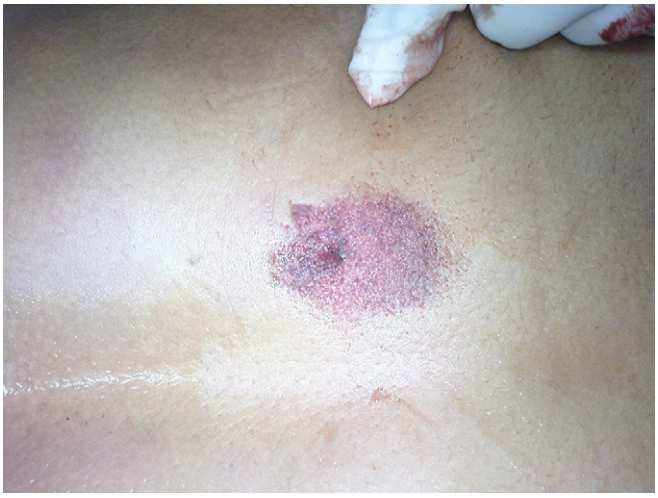

Fig. 3. Showing the 2nd firearm exit wound.

6. Opinion

Death was due to spinal shock from firearm injury.All the injuries were ante-mortem in nature and fresh in duration and could have been caused by rifled firearm. The approximate range of firing could not be estimated, as it was not possible to corroborate or discard the police theory of suicidal firing from the examination of the dead body alone. There was no sign of contact or close range firing on the dead body. All the clothes had been removed and preserved at the emergency department of the hospital. Therefore, the police was requested to submit the clothes for examination.

7. Examination of clothes

1. The jacket which was about 1.5 cm thick and black in colour had two tears, one small on the left side front of chest 0.5 cm in diameter and another large irregular on the mid part of the back, 2 cm in diameter.
2. The shirt hadthree tears, one small tear 0.5 cm in diameter on the front side of shirt(on the left side chestpocket), the other on the back side of the shirt at themiddle of shoulder area1 cm in diameter and one large tear on the mid part of the back, 2 cm in diameter.
3. The undershirt showed two tears, one small tear on the left side front of chest and one large tear on mid part of back; corresponding to the tears in the shirt.
4. The pant did not show any tear.

8. Further opinion

After examination of the clothing, the possibility of firing either from contact range or close range could not be denied or confirmed, as absence of muzzle impression on the body was possible due to interposed thick jacket and non-appreciation of blackening and tattooing effect on the jacket could be due to its black colour.

9. Discussion

9.1. Differentiating entry wound from exit wound

All the common features to differentiate entry and exit wounds from rifled firearm described in forensic medicine books are not

found in all the cases. Wound from contact range may shows muzzle impression whereas wound from close range may show burning, singeing, smudging and tattooing effects around a central defect, which are inverted on most occasions.[2–6] The main signs of inlet gunshot wound inflicted from distance have the following findings: central defect of the tissue, presence of abrasion and rub zones along the margins.[7] All the above features are absent in case of exit wound from rifled firearm. However, if skin at exit site supported for example, by trouser or brassiere band or pressure against wooden door, then the exit wound may not be everted and may look like entry.[3]

In the present case, the second exit wound situated on the back (lower part of left side chest) had inverted, without protrusion of fat, and was surrounded by a large irregular abrasion which is a feature of 'shored' exit wound. The shape of second exit wound and its long wound track through the tough body structures was not possible by any secondary projectile (fragmented bone). Therefore, the unusual appearance of second exit wound was possibly due to presence of hard resisting surface on the back of the deceased, which was later substantiated by the circumstantial history and investigation of death scene.

However, Paranitharan Pet al. reported a rare case of penetrating injury with the abrasion collar due to a fractured end of a rib protruding through the skin mimicking a gunshot wound.[8] Estimation of COHb concentration gradient and radiological visualization of lead ring ispractically not possible in every set up. In the present case, wound track could be traced from the firearm entry wound to both exit wounds.

9.2. One entry wound with two exit wounds

Tandem projectiles are unusual events; which can cause erroneous interpretations if one is unfamiliar with them.Simmons GTreported two such cases. The first case had single entrance wound with three bullets in the body. It was from a 32 caliber bullets, the two of which got lodged in a revolver barrel because of faulty ammunition. A third fired bullet pushed the lodged bullets out of the barrel resulting in a single entrance wound with three bullets in the body. The second case involved a 20 gauge shotgun shell which apparently was inadvertently loaded into a 12 gauge shotgun. This resulted in an unusual entrance wound and unusual X-rays due to fragments of the 20 gauge shotgun shell, as well as 12 gauge shotgun shell wadding, being removed from the same wound.[9]

Bentley AJ et al, reported a similar finding in a case of a homicidal gunshot wound on the chest, in which two bullets were fired in unison as tandem bullets from a handgun. At autopsy, two intact bullets were retrieved from the body of the victim, yet there was only one entrance wound and a single bullet track across the chest wall and thoracic organs.[10]

The differentiation of tandem bullets fired simultaneously versus multiple bullets fired separately entering through a single entrance wound may present difficulty in wound interpretation for the forensic pathologist.Jentzen JMet al, present a case report of three separate projectiles entering through a single perforation.[11]

In the present case, there was circumstantial history of missing of two cartridges from the magazine of the service rifle. Autopsy revealed one firearm entry wound with two exit wounds. The shape of second exit wound and its wound track through the body was not possible by any secondary projectile (fragmented bone). Therefore, two bullets must have entered through the single firearm entry wound.

In the present case, the weapon of offence was found to be an automatic rifle, from which successional firings within a second was possible.

9.3. Estimation of approximate range of firing

Distant range firearm injuries are usually not suicidal, whereas, contact or close range firearm injuries can be either suicidal or homicidal.[2–6] The interpretation of the range of fire of gunshot wounds requires coordination of information and observations by the autopsy surgeon, scene investigator, and laboratory analyst. Opinions based on the incomplete information can lead to misinterpretation. Interposed targets can cause confusion and even lead to misidentification of the points of entrance and exit of the projectile in the body.[13] In the present case, there was strong theory of suicide by contact or near contact shooting. There was no sign of contact or close range firing on the dead body. However, examination of clothes revealed that contact or near contact shooting having no sign of contact or close range shot was possible because of the thick interposition.

9.4. Suicidal vs. homicidal

The majority of the suicide victims had either left a suicide note or had medical records of previous psychiatric illness.[14] In the present case, there was neither suicidal note nor history of psychiatric illness.

Firearm suicides were more common in males and their frequency decreased as age increased.[12] Kohli Aet al. reported firearm fatalities in Delhi, in 46.7% victims, aged between 20 and 30 years. 90.7% were males; 92.6% were victims of homicidal attacks, 6.5% suicidal and 0.9% accidental.[15] Present case was of a male of 25 years old.

The typical entrance wound sites in suicides were the temple (36%), mouth (20%), forehead (11%) and left chest (15%) but uncommon entrance wound sites such as the eye, ear, and back of the neck and head has also been encountered. Gunshots to the left chest ($n = 130$), bullet paths run from right-to-left or parallel in suicides (75%) and infrequently in homicide victims (19%). Consequently, some bullet path directions cannot be considered indicative of suicide: left-to-right in gunshots to the left chest.[16] However,de la Grandmaison GLet al. reported that most of the suicide cases (85%) had a typical entrance sites. In case of suicidal gunshots to the left chest, both upwards and downwards directions and also both right-to-left and left-to-right directions can occur. Hence, direction of the projectile(s) related to the entrance site should not be the only basis for giving an indication of the manner of death.[17] In the present case, the firearm entry wound was on the left side front of chest, bullet paths were in a backward, with upward and left-to-right direction. de la Grandmaison GL et al. reported that close range shooting was found in 53.5% of the homicide cases and in all suicide cases. Similarly, Balci Yet al. reported that majority (72.3%) had contact or near contact shooting distance in their reported suicidal cases.Doichinov IDet al. reported that it is rare in forensic practice to have more than one gunshot wounds in a suicide.[18] Karger Bet al. reported that more than 1 gunshot injury was found in 5.6% of the suicides (maximum 5 gunshots) and in 53.9% of the homicides. The suicidal gunshots were fired from contact or near contact range in 89% while this was the case in only 7.5% of the homicides.[16]

Desinan L et al reported on 33 suicidal deaths using firearms where single entrance wounds were found, apart from onecase with two entrance wounds.[19] Similar findings were found byDruid Het al. in theirthree percent of the suicide victims.

In all groups, shotguns were the most frequent used weapon.[14] Balci Yet al. reported that in case of firearm fatalities, the usage of long-barreled weapons was 47.7%. Thirty-four out of 45 gunshot suicide victims had licensed weapons because of their occupations.

In the present case, the victim had used long barreled automatic service rifle because of his occupation.

10. Conclusion

Differentiation of firearm entry wound from exit wound is not an easy task. Atypical appearances of the firearm entry wound and exit wound should always be kept in mind. To estimate approximate range of firing, examination of clothes may be very helpful in doubtful cases. Multiple bullets can enter through single entry wound within a second in case of firing from automatic rifled firearms.

Conflict of interest statement

This is to certify that the case report submitted by us is our own observation. This case report has not been submitted to any other journal for publication. The work has been carried out without any financial help from any people or institution.

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